6(a)	series charges: $Q_S = Q_1 = Q_2$
	series p.d.s: $V_S = V_1 + V_2$
	parallel charges: $Q_S = Q_1 + Q_2$
	parallel p.d.s: $V_S = V_1 = V_2$
6(b)(i)	$E = \frac{1}{2} CV^2$
	p.d. $= [(2 \times 19 \times 10^{-3}) / (470 \times 10^{-6})]^{1/2}$ $= 9.0$ V
6(b)(ii)	$E = Q^2 / 2C$ **or** $C = Q / V$
	$Q = (19 \times 10^{-3} \times 2 \times 470 \times 10^{-6})^{1/2}$ **or** $Q = 470 \times 10^{-6} \times 9.0$ $Q = 4.2 \times 10^{-3}$ C
6(b)(iii)	total charge unchanged
	total capacitance $= (470 + 180) \times 10^{-6}$ (F)
	$E = Q^2 / 2C = (4.23 \times 10^{-3})^2 / (2 \times 650 \times 10^{-6})$ (= 0.014 J) $E = 14$ mJ

4(a)	combined capacitance of parallel capacitors = 30 (μF)
	total capacitance $= (1 / 45 + 1 / 30)^{-1}$ $= 18$ μF
4(b)	$E = \frac{1}{2}CV^2$
	$\Delta E = \frac{1}{2} \times 45 \times 10^{-6} (9.6^2 - 8.0^2)$ $= 6.3 \times 10^{-4}$ J
4(c)(i)	gaps in circuit closed and correct symbol for capacitor shown in parallel with load resistor
4(c)(ii)	two correct pairs of values of t and V read off from within same discharge cycle, e.g. (5.0, 4.0) and (13.0, 3.2)
	correct substitution of values of V, V_0 and Δt into $V = V_0 \exp(-\Delta t / \tau)$ e.g. $3.2 = 4.0 \exp(-8.0 / \tau)$
	$\tau = 36$ ms
4(d)(i)	8.0 W
4(d)(ii)	4.0 W

5(a)	from graph $\ln Q = 2.9$ (so $Q = 18.2$ μC)
	$C = Q / V$
	$= 18.2 / 12 = 1.5$ μF
5(b)	gradient = –0.25
	gradient $= -1 / RC$
	$R = 1 / (0.25 \times 1.5 \times 10^{-6})$ $= 2.7 \times 10^6\ \Omega$
	or $\dfrac{Q}{Q_0} = e^{-t/CR}$ **or** $\ln Q - \ln Q_0 = \dfrac{-t}{CR}$
	e.g. $\dfrac{4.95}{18.2} = e^{-5.2/(1.5 \times 10^{-6} R)}$ **or** $1.6 - 2.9 = 5.2 / (1.5 \times 10^{-6} R)$
	$R = 2.7 \times 10^6\ \Omega$
5(c)	$W = \frac{1}{2} QV$
	$= \frac{1}{2} \times 18.2 \times 10^{-6} \times 12$ $= 1.1 \times 10^{-4}$ J
	or $W = \frac{1}{2} CV^2$
	$= \frac{1}{2} \times 1.5 \times 10^{-6} \times 12^2$ $= 1.1 \times 10^{-4}$ J
	or $W = \frac{1}{2} Q^2 / C$
	$= \frac{1}{2} \times (18.2 \times 10^{-6})^2 / 1.5 \times 10^{-6}$ $= 1.1 \times 10^{-4}$ J
5(d)	straight line with different negative gradient starting from (0, 2.9)
	straight line between $t = 0$ and at least $t = 5.0$ s with twice the gradient of the original line